

# FASAD: First Floor Existing Condition Report

October 30<sup>th</sup> 2015



## Report Summary

Contained in this document are analytical reports which detail the current conditions of the main structural components of the Southwest Barracks at Fort Adams in Newport Rhode, Island. The Fort exhibits severe deterioration and hazardous structural deficiencies, having been abandoned and unmaintained for decades before the founding of the Fort Adams Trust. As per the scope of services of the Fort Adams Structural Analysis and Design Project, the Roger Williams University School of Engineering (SEECM) senior design team has visited the Fort on a weekly basis in order to ascertain the required information in order to accurately assess the present conditions of the Southwest Barracks.



Site evaluations of the Fort gave valuable insight to the current conditions and the building's construction. The scope of the site evaluations included verifying the measurements and accuracy of as built drawings from Historical American Building Survey dated 1973 in order to create new as built drawings, as well as extensive photo documentation and visual inspection of the structural components of the Southwest Barracks. Through the site evaluation process, it has been determined that the Southwest Barracks will most likely require major renovations, rehabilitation, restoration, and reconstruction in order for the space to be repurposed as an event space and/or museum.

This report was divided into sections detailing each major structural component including but not limited to, girders, joists, masonry archways, and columns located on the first floor and in the interstitial space of the building.

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## Existing Conditions

### Main Span Girders

**Location:** Span the first floor ceiling supporting the second floor joists

**As Built Material:** Heavy Timber (13-1/2'x11-1/2')

**Condition:** Average

**Comments/Descriptions:** The timber girders run the length of the entire first floor and function to support the joists for the second

floor. The girders are primarily not visible from the first floor due their location in the interstitial space above the masonry arches that span the structure. The timber girders have actual dimensions of 13-1/2'x11-1/2' and approximately 24' long (see Figure 1). The girders have visible cracking throughout on both the top and side planes. The extent of the cracking and the type of wood is also unknown at this time. The girders are supported at both ends by masonry columns and rest atop most of the masonry arch structures throughout the space as shown in Figure 2. The ends of the girders rest on the metal base plates of the iron structural columns which rest on top of the masonry block columns as shown in Figure 3.

The end girders are fixed in keys located in the exterior Southwest Barracks brick masonry walls as shown in Figure 4. The keys act as fixed supports at the ends of the heavy timber girders, but currently are a major liability in the structural integrity of the girders. Due to the waterfront location of the Fort and the natural moisture which occurs in masonry structures, deterioration and rotting of the wooden girders at their connections is a serious concern which must be taken into account during the analysis and redesign.



**Figure 1:** The photo was taken next to the first floor staircase in between the first and second floor. Note how the girder rests on a masonry column and travels over the masonry archway (right of photo).



**Figure 2:** The girder is supported by the concrete/masonry arches spanning the space.



**Figure 3:** The girder shown in the picture is cut to allow the iron column to rest atop the masonry block column.



**Figure 4:** The phot shows an end girder rests in a key inside the brick masonry wall.

## Floor Joists

**Location:** Span the width from the interior wall of the Fort to the exterior wall supporting the second floor.

**As Built Material:** Timber Joists (2"x12"  
@16" O.C.)

**Condition:** Average/Poor

**Comments/Descriptions:** The timber floor joists (wood type unknown) run the width of the Southwest Barracks. The joists 2"x12" are spaced 16" on center and function as the structural supports for the second floor structure (see Figure 5). Three joists were used to span the width of the Southwest Barracks, flushed faced as shown in Figure 6. The interior joists span the distance between two main span girders that run the length of the Southwest Barracks. These joists are nailed in place and notched to fit into the main girders. The exterior joists connect from the exterior walls to the main span girders.

The exterior joists attach to the the exterior walls of the Southwest Barracks by keys cut out of the brick masonry exterior walls as shown in Figure 7 below. The timber to masonry connections are not acceptable with regards to modern construction practices due to the high moisture content of the brick masonry walls. The location of the Fort and its proximity to the Naragansett Bay has caused major deterioration and rott to occur in the timber joists at their connection points to the South-most facing exterior walls of the Fort rendering them structural defficient.

Cross bridging is installed between each joist. The bridging provides lateral support for the joists and is common in modern construction. Some of the bridging is currently missing in between the joists and needs to be replaced as shown in Figure 8.



Figure 5: The photo was taken from the first floor where the archway was removed. Note that the joists above support the 2<sup>nd</sup> floor.

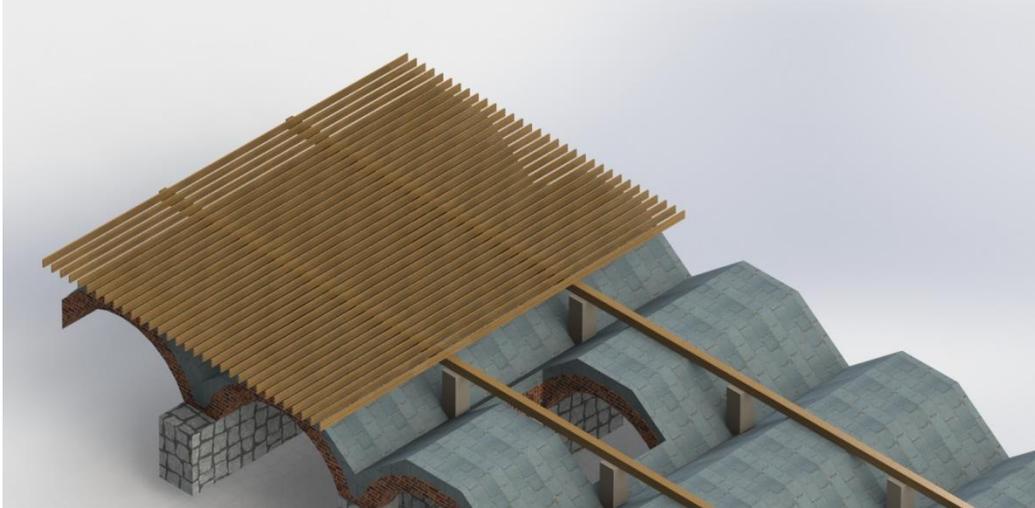


Figure 6: The image shown is a screenshot of a 3D model of the first floor structure. Shown are the 2"x12" joists at 16" on center. Note that that it takes three joists to span the width of the southwest barracks. The joists are currently set as flushed faced with no overlap.



Figure 7: The photo shows the joist connection to the masonry wall. Note that the timber joist sits into the masonry in a key.



Figure 8: The photo shows the bridging between each joist in the center of each joist span. Note that some bridging is currently missing.

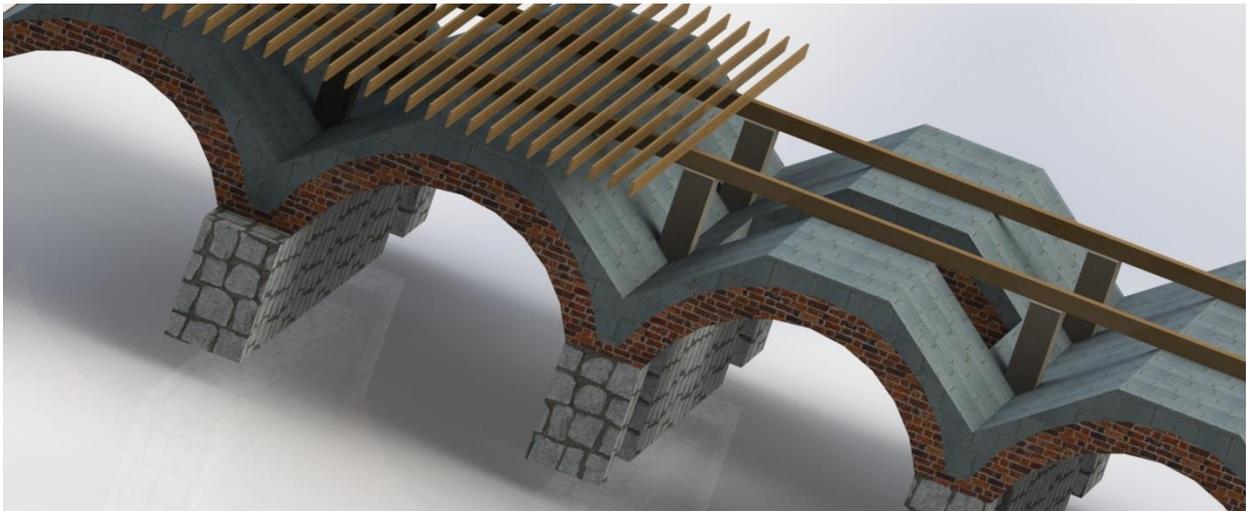
## Masonry Arches

**Location:** Throughout the first floor.

**As Built Materials:** Brick, Stone, Gray Shale Masonry

**Condition:** Good

**Comments/Descriptions:** The masonry arches run along the first level of the Southwest Barracks. The composition of the masonry arches was easily observed due to the deterioration of the lath and plaster which used to completely line the wood studded walls of the first floor as shown in Figure 9. The vault line of the arches is composed of brick (see Figure 11). This is typically 2' thick. A layer of gray shale masonry rock covers the brick vault line with a maximum thickness about 2'. The piers under the arches are made from a combination of stone and shale with an approximate thickness of 5'. shown in Figure 10. Overall, the spacing of the arches is about 23' on center. Masonry block columns are located over the piers and in between each arch. As shown in Figure 8 the masonry arches support the girders which support the second floor of the Barracks. The arch system does not seem to have suffered significant deterioration. Bricks, stone, and shale are adequately preserved.



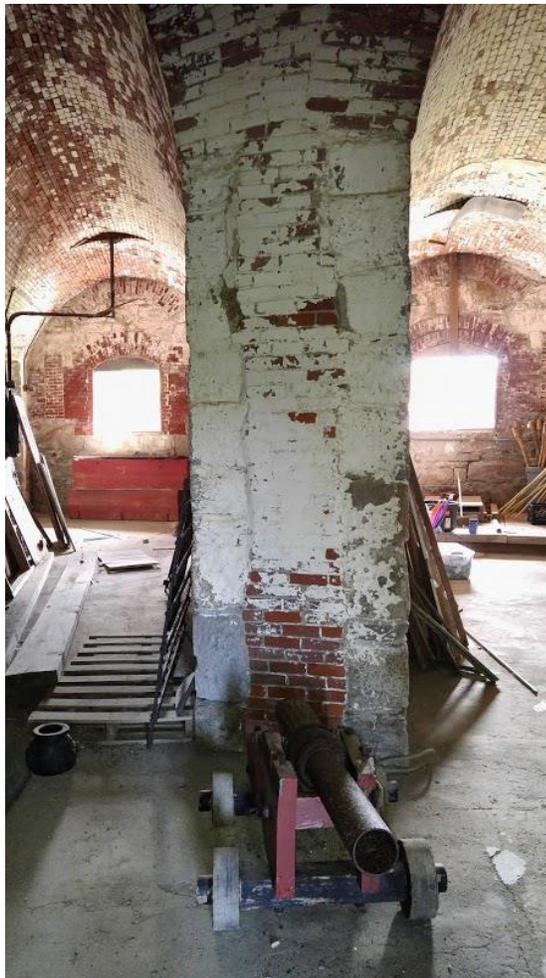
**Figure 8: The arches support the main girders supporting the second floor and are a base for masonry block columns.**



**Figure 9: Deterioration of the lath and plaster exposed the composition of the arches. Brick vault line is in good condition.**



**Figure 10: This is a pier wall under an arch made from local stone and shale. The structure is sound.**



**Figure 11: The brick masonry arches located in the Southwest Barracks Armory have been well preserved and are in good condition.**

## Interior Wood Studded Wall

**Location on First Floor:** Most western room has a wood wall running the length of a room and 4 divider wood walls

**As Built Material:** Wood Frame

**Condition:** Poor

**Comments/Description:** The western room on the first floor contains a wooden framed wall separating another room. This is believed to be in place because there is not a full arch located at this section unlike the rest of the first floor. This wall is shown in Figure 13. The wall connects to a half arch and protrudes the rest of the length 35' down the room.

The wall is not load bearing and functions mainly as a partition between the rooms. Figure 12 is another example of a partition wall on the first floor of the Fort. The frame appears to be in average condition but the nails holding it together have primarily rusted away and most likely will not be salvageable. The wood studded construction is also used as a façade or covering over the interior arches as shown above in Figure 9 in order to function as a base for lath and plaster wall cover.



Figure 12: Wooden dividing wall in between two rooms.



Figure 13: Is a photo of the wooden framed wall that runs north to south in the most westerly room. This is not load bearing and has a column enclosed inside of it.

## Interior Wall Finishing

**Location on First Floor:** All rooms except for the Armory

**As Built Materials:** Lath and Plaster

**Condition:** Poor

**Comments/Description:** On the entire first floor, with the exception of the armory, the interior walls of the Fort are concealed by lath and plaster wall cover. The detail of the finishing is shown in Figure 14. This covering occurs on all of the interior walls and ceilings and is attached to wood stud framing. The amount of deterioration throughout the first floor varies but majority of the material is falling down, weathered and not salvageable. Figure 15 shows the variation of the condition of this finishing.



Figure 14: Taken under the most west staircase and shows the detail of the wall finishing.



Figure 15: This photo shows the variation of lath and plaster conditions on the first floor. It was taken looking at the south side of the barracks.

## Smooth Arch Doorways

**Location on First Floor:** All rooms, primarily on the southern side

**As Built Materials:** Stone and masonry

**Condition:** Good

**Comments/Description:** There are five smooth arch doorways on the first floor not including the armory. They connect rooms to each other and are located on the southern side of the length of the room. They are typically 10' high to the peak of the arch, 6' wide and 5' deep. The bottom on the arch is made of square stones with a smooth finish, the top of the arch or curve is made of brick.



Figure 15: Shows the smooth finish on the blocks in the doorway arch. This photo was taken looking in to boiler room.



Figure 12: This photo looks into the doorway of the boiler room. It shows a double arch structure.

The smooth finished blocks are detailed in Figure 15, above. They are double arches, meaning there is another brick curve under nether the flooring. Figure 16, shows part of that double arch located in the boiler room. This is the only section where they are visible. These arches are built into the larger arches that run over the room.

## Rough Arch Doorways

**Location on First Floor:** All rooms, primarily on the northern side

**As Built Material(s):** Stone

**Condition:** Good

**Comments/Description:** There are five rough arch doorways on the first floor. These rough cut arches were cut out of the masonry piers supporting the masonry and brick archways in order to allow access and flow between each room on the first floor. These rough cut arches are on the northern side (interior Fort wall) and shown in Figure 17, below. The arches are typically 10' high at the peak, 6' wide and 5' deep. It appears these doorways were an afterthought and chipped away after creating the jagged stones. The finishing is shown in Figure 13. There is no masonry top to these arches either.



Figure 13: Shows the rough edges of the doorway.

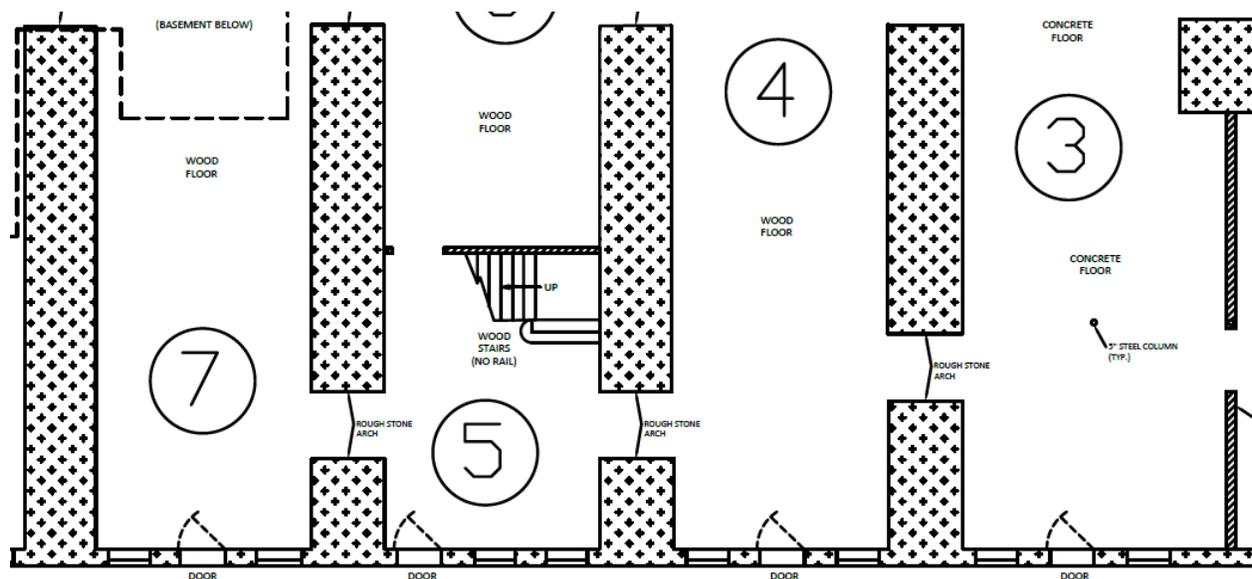


Figure 14: The photo is a screen shot of as built drawings for the Southwest Barracks. Note that the rough stone arch ways are called out and connect the rooms together.

## Interior Columns

**Location on First Floor:** First floor on the right when entering the Barracks (Room 1, 2, 3),

**As Built Material:** Cast Iron

**Condition:** Poor

**Comments/Description:** There are only three columns in the first floor. These columns are located in rooms 1 and 3 (Figure 16 below), with one of the columns located in the wall between the two rooms (Figure 17). The columns support the main span girders which support the load of the second floor. The columns are all in poor condition which is attributed to significant oxidation and deterioration. The columns also may not be sufficient for meeting modern building codes, especially if the second floor was to be used as an event space in the future. Column number 3 is currently not supporting any load as it is not currently connected to the main span girder located above. Column number 3 is also effectively rotted out at its base as well which leads to major concerns regarding the other columns located throughout the structure.



Figure 15: The photo shows an image of column 1, located in room 1.

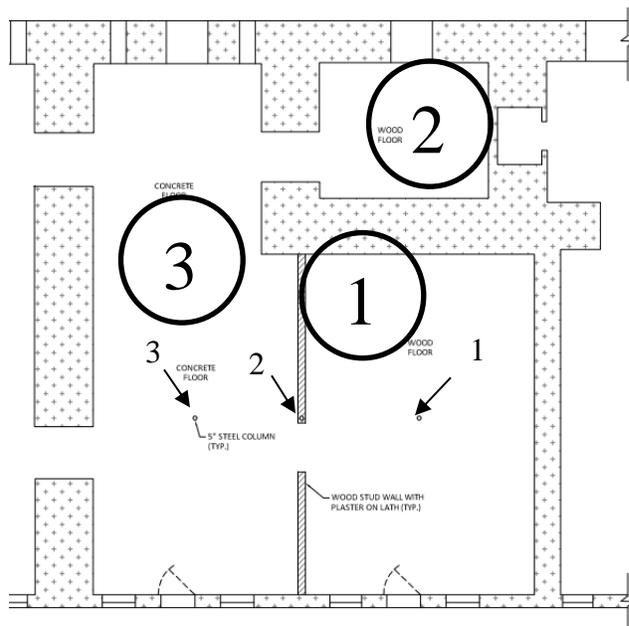


Figure 16: This is an AutoCAD drawing of the locations of the columns in the first floor of the Southwest Barracks.

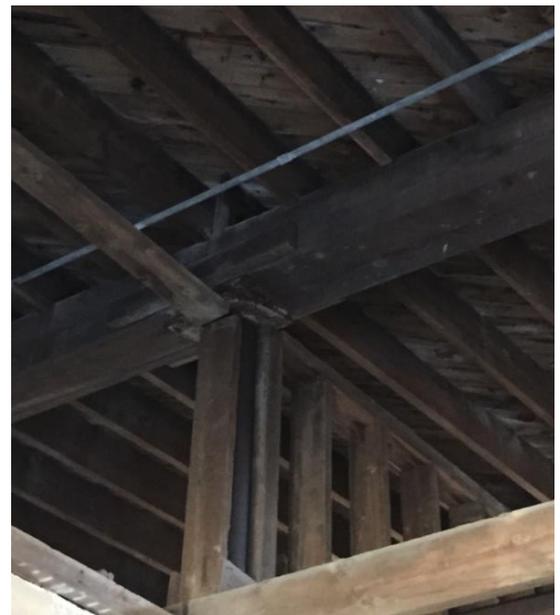


Figure 17: Column 2, located in between the partition wall frame wall between rooms 1 and 3.

## Outdoor Balcony

**Location on First Floor:** Outer two story balcony located on the northern side of the southwest barracks.

**As Built Materials:** iron columns and concrete footings

**Condition:** Poor

**Comments/Description:** The balcony starts on concrete footings and iron plates, Figure 18. The four columns that still exists extend up to the spilt of stone and masonry on the exterior wall. It appears that the iron is placed into slots in the side of the building. This is where the balcony floor would have been places. The balcony floor seems to have been supported with diagonal crossbars and the same design was used to support the roof shown in Figure 19. There is also still a three rung railing system. Only part of the balcony structure still exists and there is no roofing or flooring elements. Figure 20 shows the balcony as a whole.



Figure 14: Is the footing of the balcony



Figure 19: Shows crossbars of balcony



Figure 20: Shows the balcony as a whole structure.